<u>CLAIMS</u>

What is claimed is:

1.   A method, comprising:

5   directing a laser beam at a mixture of carbon nanotubes

disposed in a microfluidic layer in laminar flow, the laser beam having a

frequency less than a resonant frequency of at least one target class of

carbon nanotubes, the resonant frequency determined by diameter and

chirality of the target class of carbon nanotubes, the mixture including at

10 least one target class of carbon nanotube;

          trapping at least one target carbon nanotube; and

          moving the target carbon nanotube into a second microfluidic

layer in laminar flow.

15 2.   The method of claim 1, further comprising identifying the resonant

frequency of the target class of carbon nanotubes.

3.   The method of claim 2, further comprising determining diameter

and chirality of the target class of carbon nanotubes.

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4.   The method of claim 3, further comprising determining a

relationship between diameter, chirality, and resonant frequency of the

target class of carbon nanotubes.

5.   The method of claim 1, further comprising collecting at least one target carbon nanotube from the second microfluidic layer in laminar flow.

5   6.   The method of claim 1, further comprising un-bundling the mixture of carbon nanotubes.

7.   The method of claim 1, wherein the target class of carbon nanotubes are metallic single-walled carbon nanotubes.

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8.   The method of claim 1, wherein the target class of carbon nanotubes are semiconductor single-walled carbon nanotubes.

9.   The method of claim 1, wherein, the mixture of carbon nanotubes

15   includes another target class of carbon nanotubes, the method further comprising:

        directing a laser beam having another laser frequency at the mixture of carbon nanotubes, the another laser frequency being less than

20   a next resonant frequency of the next target class of carbon nanotubes, the other resonant frequency determined by diameter and chirality of the other target class of carbon nanotubes;

        trapping the other target class of carbon nanotubes; and

moving the other target class of carbon nanotubes into a

third microfluidic layer.

10.   The method of claim 1, further comprising:

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directing another laser beam having a laser frequency less

than the resonant frequency of the target class of carbon nanotubes at

the mixture of carbon nanotubes,; and

trapping the target class of carbon nanotubes; and

10   moving the target carbon nanotubes into the second

microfluidic layer.

11.   The method of claim 1, wherein the microfluidic layer is water.

15 12.   An apparatus, comprising:

a laser to emit a laser beam having a frequency lower than a

resonant frequency corresponding to a target class of carbon nanotubes,

the resonant frequency determined by diameter and chirality of the target

class of carbon nanotubes;

20   a first microfluidic layer in laminar flow, the first microfluidic

layer having a mixture of carbon nanotubes, the mixture of carbon

nanotubes having at least one target carbon nanotube; and

a second microfluidic layer in laminar flow, the second

microfluidic layer in proximity with the first fluid,

the laser beam optically coupled to induce at least one optical dipole trap in the target carbon nanotube and to move the target carbon nanotube into the second microfluidic layer.

5   13.   The apparatus of claim 12, wherein the first and second microfluidic layers comprise water.

14.   The apparatus of claim 12, wherein the target class of carbon nanotubes is metallic single-walled carbon nanotubes.

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15.   The apparatus of claim 12, wherein the target class of carbon nanotubes is semiconductor single-walled carbon nanotubes.

16.   The apparatus of claim 12, further comprising a third microfluidic

15   layer in laminar flow, the third microfluidic layer in proximity with the second microfluidic layer.

17.   The apparatus of claim 16, wherein the laser beam is coupled to emit a next frequency lower than a resonant frequency corresponding to a

20   next target class of carbon nanotubes in the mixture of carbon nanotubes, the next resonant frequency determined by diameter and chirality of the next target class of carbon nanotubes, the laser beam being optically coupled to trap the next target class of carbon nanotubes

and to move the next target class of carbon nanotubes into the third

microfluidic layer.

18.   The apparatus of claim 12, further comprising a first collector to

5   collect the target class of carbon nanotubes.

19.   A system, comprising:

        an apparatus coupled to direct a laser beam at a mixture of

carbon nanotubes disposed in a microfluidic layer in laminar flow, the

10   laser beam having a laser frequency less than a resonant frequency of at

least one target class of carbon nanotubes, the resonant frequency

determined by diameter and chirality of the target class of carbon

nanotubes, the mixture including at least one target class of carbon

nanotube, the laser beam to move the target carbon nanotube into a

15   second microfluidic layer in laminar flow, the apparatus to collect the

target carbon nanotube from the microfluidic layer in laminar flow; and

        a piezoelectric tube coupled to the collected target carbon

nanotube.

20   20.   The system of claim 19, further comprising a current amplifier

coupled to the collected target carbon nanotube.

21.   The system of claim 20, further comprising a display coupled to the

current amplifier.

22.   An article of manufacture, comprising:

a machine-accessible medium including data that, when accessed by a machine, cause the machine to perform the operations

5   comprising:

directing a laser beam at a mixture of carbon nanotubes disposed in a microfluidic layer in laminar flow, the laser beam having a frequency less than a resonant frequency of at least one target class of carbon nanotubes, the resonant frequency determined by

10   diameter and chirality of the target class of carbon nanotubes, the mixture including at least one target class of carbon nanotube;

trapping at least one target carbon nanotube; and

moving the target carbon nanotube into a second microfluidic layer in laminar flow.

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23.   The article of manufacture of claim 22, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising identifying the resonant frequency of the target class of carbon nanotubes.

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24.   The article of manufacture of claim 23, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising identifying the diameter and chirality

corresponding to the resonant frequency of the target class of carbon nanotubes.

25. The article of manufacture of claim 24, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising determining a relationship between diameter, chirality, and resonant frequency of the target class of carbon nanotubes.

26. The article of manufacture of claim 22, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising collecting the target carbon nanotube from the second microfluidic layer in laminar flow.

27. The article of manufacture of claim 22, wherein the machine-accessible medium further includes data that cause the machine to perform operations comprising un-bundling the mixture of carbon nanotubes.